Book of Abstracts

11th International Conference on Life Cycle Assessment of Food 2018 (LCA Food)

in conjunction with

6th LCA AgriFood Asia

and

7th International Conference on Green and Sustainable Innovation (ICGSI)

"Global food challenges towards sustainable consumption and production"

16 – 20 October 2018

Bangkok, Thailand

Organized by

KU KASETSART UNIVERSITY

KMUTT

NSTDA

The 11th International Conference on Life Cycle Assessment of Food 2018

in conjunction with

The 6th LCA Agri-Food Asia 2018
and
The 7th International Conference on Green and Sustainable Innovation 2018

Organized by

Centre of Excellence on enVironmental strategy for GREEN business (VGREEN), Faculty of Environment, Kasetsart University (KU)
The Joint Graduate school of Energy and Environment (JGSEE),
King Mongkut's University of Technology Thonburi (KMUTT)
and National Science and Technology Development Agency (NSTDA),
Ministry of Science and Technology

Pesticide emission and toxicity models in LCA need to be adapted for tropical regions

Céline Gentil[1,2*], Claudine Basset-Mens[1,2], Peter Fantke[3], Charles Mottes[1,2]

[1] *Univ Montpellier, CIRAD, Montpellier, France*

[2] *CIRAD, HortSys, ELSA, F-97285 Le Lamentin, Martinique, France.* [3] *DTU, Technical University of Denmark, Lyngby, Denmark*

Abstract

Currently available Life Cycle Inventory (LCI) pesticide emission models and Life Cycle Impact Assessment (LCIA) human toxicity and (eco)-toxicity characterization models were typically designed and parameterized based on temperate conditions. Taking pesticide emissions and their toxicity impacts on environment and human health into account in Life Cycle Assessment (LCA) studies is important in tropical regions, because large quantities of pesticides are used to increase crop yields and ensure food security. The objective of our study was to identify the characteristics that determine pesticide emissions and their impacts in tropical conditions, and to assess to what extent current LCI and LCIA models need to be adapted to better account for these conditions. We investigated existing models and conducted a systematic review of the characteristics that drive pesticide emission patterns and related toxicological impacts in the tropics. Our results indicate that high temperatures, high rainfall, soil characteristics (low organic carbon content, and often low pH) and cropping systems (e.g. mulching, application techniques) are important drivers of pesticide- related emissions in tropical conditions; and should be accounted for in existing LCI and LCIA models. However, as these processes are not as well understood as in temperate regions, and fewer measurements are available, further research is urgently required.

***Keywords**: Life cycle assessment; pesticides; emission models; toxicity characterization models; tropical regions*

**Corresponding author. Tel.: +596-(0)596423062*
E-mail address: celine.gentil@cirad.fr